Space Weather Forecast

Issued on Saturday, 17 February 2024 at 00:40 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely and a slight chance of Strong flares. Slight chance of S1/Minor Radiation Storms. Slight chance of G1/Minor Geomagnetic Storm Day 3-4 (19-20 Feb) due to possible CME arrival.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been High, with a Strong flare peaking at 16/0653 UTC, from the large and complex region which is on the southwest limb. This region is now no longer visible on the southwest limb, but likely remains a large, magnetically complex sunspot region, and will contribute a gradually decreasing amount to flare probabilities for the next day or two. A region in the northwest has developed further intermediate spots, with some minor magnetic complexity. The remaining regions currently appear mostly simple, with no significant development observed.
A couple of possible Earth-directed Coronal Mass Ejections (CMEs) were observed in the past 24hrs. The first occurred near north-centre disc which may give a glancing blow on 19 Feb, and a second in association with the Strong flare from the southwest limb which is now considered most likely to miss.
Solar Wind / Geomagnetic Activity: Solar winds have been at ambient or slightly elevated levels, although a weak transient appeared to arrive after 16/0900 UTC. Wind speeds were around or just below 400 km/s. The Interplanetary Magnetic Field was mostly weak, but briefly reached moderate levels after the transient arrived. The north-south component varied moderately but was mostly northward directed. Geomagnetic activity was Quiet (Kp 0 to 2).
Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was elevated above background levels, but remained below the S1/Minor Radiation storm threshold throughout.

Four-Day Space Weather Forecast Summary
Solar Activity: Further Moderate activity is likely, with a slight chance of Strong flares. Activity is expected to decline through the next couple of days as the large region in the southwest rotates well onto the far side of the Sun.
Solar Wind / Geomagnetic Activity: Two possible Earth-directed CMEs were identified in the past 24 hours. Both of these are considered more likely to miss Earth, but with the possibility of some glancing influence from one of these either late Day 3 (19 Feb) or early Day 4 (20 Feb). In the absence of any CME arrivals, solar wind speeds are expected to remain near ambient or perhaps at slightly elevated levels.
Geomagnetic activity is expected to be mostly Quiet through this period, perhaps becoming Unsettled to Active with a slight chance of an isolated G1/Minor Storm interval with any CME arrival on Days 3-4.
Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to decline towards background levels in the absence of any further enhancements, although the complex region in the southwest quadrant still presents a risk of additional radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	50	40	40
Very Active	R3 to R5 X	Yes	20	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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